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METROPOLITAN LIFE INSURANCE COMPANY

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Multiple Births

PROBABLY no five babies have ever received such concentrated attention from the public at large as the quintuplets born about two months ago to a Canadian mother. Thus the general subject of plural births has come into prominence; such births constitute indeed one of the more remarkable phenomena in the physiology of human reproduction. It just so happens that in the human species by far the most common number of births at one confinement is one. But, although the number born at one confinement is in the great majority of cases thus limited, and is both lower and less variable in our species than in the case of most other mammals, a certain degree of variation does exist, and is found to obey, at least roughly, some kind of a law. As plural births go, twins are fairly common, about one in 87 confinements giving rise to twins. But the scarcity of plural births goes up very fast with the number born at one confinement. It has, in fact, been pointed out by W. W. Greulich of the University of Colorado that the scarcity increases approximately like the powers of 87; while one confinement in 87 brings twins into the world, triplet births would be expected about once in 7,569 confinements, this number being the square of 87; and quadruplets once in 658,503 births, this being the cube of 87. If this law continued for higher orders of plural births we should expect quintuplets once in 57 million confinements.

How do these theoretical figures compare with those actually observed in the United States in the five-year period 1926 to 1930? Actually there was one pair of twins per 86.3 confinements, one set of triplets per 8,745 confinements, and one set of quadruplets in 552,000 confinements. There were within this period of five years no quintuplets, as indeed might have been expected by the rule, since the total number of births in these five years was only about 10 million, and the rule calls for quintuplets only once in 57 million or say about once in 30 years. Thus it will be seen that in a very rough way the figures for the five-year period, 1926 to 1930, follow Greulich's rule cited above. Perhaps it should be pointed out that anything like close agreement cannot possibly be expected, because with such rare events as the birth of quadruplets and quintuplets a very large sample would

be required to obtain a reliable average figure.

That the numbers cited above are by no means purely numerical curiosities is at once seen when similar observations are extended to other countries. Unfortunately, the variations in the manner of recording births, especially as regards the complicating factor of stillbirths, varies so greatly in different countries that only a few comparisons are possible. However, the following figures can be cited. In Germany, for the eight-year period, 1922 to 1929, there was one pair of twins in every 84 confinements, one set of triplets in every 8,586 confinements and one pair of quadruplets in 679,446 confinements. In Switzerland, over the seven-year period 1926 to 1932, the corresponding figures were twins in 80, triplets in 7,038, and quadruplets in 492,629. Lastly, in Canada, from which the present stir regarding plural births originates, the birth records from 1923 to 1931 show one twin birth for every 82 confinements, one triplet birth for every 7,748 confinements and there was one quadruplet birth in about every million confinements. No quintuplets were born during the nine-year period studied. This is only parallel to our own experience, for within our Registration Area in the ten-year period 1923 to 1932 there has not been a single case of quintuplets in the approximately 21,000,000 confinements falling within this period.

Does plural birth handicap the child's chance of life? Quite naturally one would expect this to be the case, and, in point of fact, the records do in some degree bear out this supposition. In the total births that took place in the 10 years 1923 to 1932 in the United States, among those born at a single birth, 96 per cent. were born alive; at twin births, only 92 per cent. were born alive; at triplet births, 86 per cent., and at quadruplet births, only 72 per cent. There is thus a continual gradation, as the number at one confinement increases, culminating in a very marked handicap against the quadruplet child being born alive. Viewing these figures we are all the more pleased to recall that the quintuplets born to the Canadian mother two months ago, and born prematurely at that, fared so well and are all still alive today, thus establishing a record without precedent. It is very pleasing to think that their survival is in no small degree due to the sympathetic care and to the excellent medical attention, in the full light of medical science, which they have received.

Is the occurrence of plural births in any way related to the age of the parents? This question can be quite definitely answered by the study of the statistics. The graph on page 3 exhibits the distribution of births according to age of the father and age of mother, first for single births and second for all plural births, twins, triplets and quadruplets combined. The diagrams require very little comment as they speak for themselves. It will be seen that the age group for mothers in which single births occur most frequently

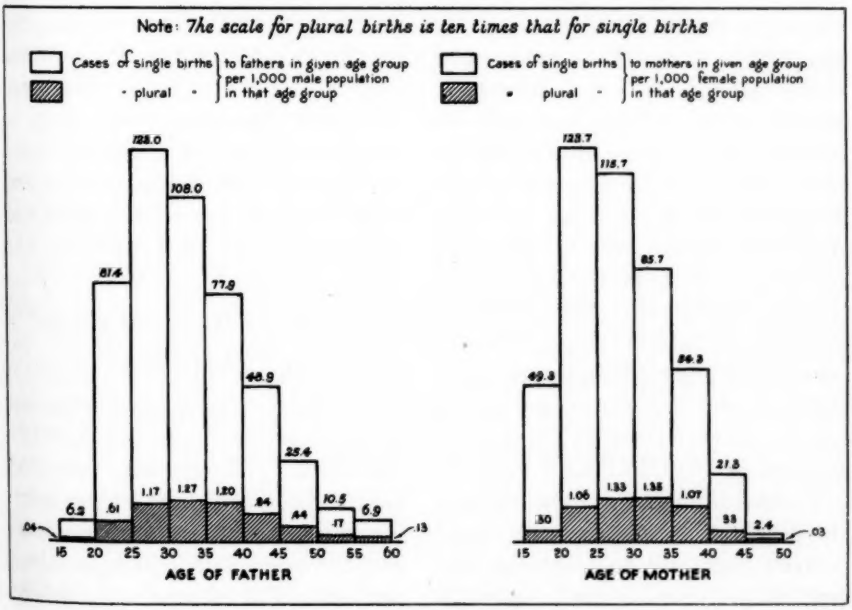
is the group from 20 to 25 years, the second in order being the group from 25 to 30. In contrast with this, plural births are most frequent in the age group 30 to 35, about eight years later than the range of maximum for single births. Another interesting characteristic feature of the diagram is the following: The frequency distribution for single births is strongly asymmetrical or skew, rising rapidly to its peak in the second quinquennium and then falling off more gradually at the right-hand side of the diagram. In contrast with this the frequency distribution curve for plural births is almost exactly symmetrical.

Conditions very similar to these are exhibited with regard to fathers in the left-hand side of the graph. Here also the peak for the single births comes a good deal earlier in life for the father than the peak of the plural births.

A single figure which brings out some of the differences in the age distribution of mothers and fathers at the birth of their children in the case of single and plural births is the average age of the parent at the time of the birth of the children, namely, for mothers, 28 years for single births, 30.2 years for twins and 31.6 years for triplets. The sample for quadruplets is altogether too scant to secure the average ages for these. In the case of fathers the

AGE DISTRIBUTION OF PARENTS AT BIRTH OF CHILD IN SINGLE AND IN PLURAL BIRTHS

United States Birth Registration States, 1930



average age for single births is 32.7 years, for twin births 35.1 years, and for triplet births 36.9 years—thus triple births occur on an average over four years later than single births.

The sex composition of pairs of twins or sets of triplets or quadruplets is not a matter of accident. It is determined by certain definite principles. That it follows a certain law, at least in the case of twins, will be shown in an article in a later issue dealing expressly with twins, for the case of twin births furnishes, of all plural births, by far the most abundant statistical material and for that reason lends itself to certain definite analysis which it would hardly be worth while to attempt for the higher orders of plural births.

Mortality Experience of the First Six Months of 1934

IN THE STATISTICAL BULLETIN for January we showed that the vitality of the American and Canadian peoples, in so far as it is measured by their deathrates, had been maintained throughout the most severe industrial depression of a generation. Now, that there has been a definite turn in the economic tide, we can report that the two countries are still experiencing remarkably low mortality rates, even if the rate for the first half of 1934 has not been quite as favorable as that for the like part of three of the four years immediately preceding. The basis for this conclusion is the mortality record, for the first six months of 1934, of the many millions of Metropolitan Industrial policyholders. Their cumulative deathrate was 9.5 per 1,000; and in only three of the last ten years has a lower mortality rate prevailed, namely, in 1933, 1932 and 1930.

Furthermore, the margin between the deathrate for the first half of the current year and that for the like part of last year, is small—only 2.9 per cent. One of the best June health records in the history of this large group of insured persons had the effect of reducing this margin materially; for, at the end of May, it was 4.4 per cent. It may well be found later that the small difference is entirely due to the rise in the average age of the policyholders this year. Indeed, a group of about a million policyholders who live in the Pacific Coast and Mountain States have registered a lower deathrate this year than last; and among a similar number of insured Canadians, the 1934 figure is identical with the record low point established for the like part of last year.

Records for White and Colored Policyholders

When the comparison with last year's record is confined to the white Industrial policyholders, we find that the rise was only 2.1 per cent.; for insured negroes, however, there was the much larger increase of 6.6 per cent. The colored policyholders

registered much larger increases than did the whites in the deathrates from a number of important causes, notably, cancer, cerebral hemorrhage, heart disease, respiratory conditions, chronic nephritis and accidents.

New Minimal Deathrates in Prospect for Several Causes of Death

The mortality rates for diphtheria, tuberculosis and the puerperal diseases are lower than ever previously recorded for the first half of any year. There is every probability that in the case of diphtheria and tuberculosis, at least, new low deathrates will be in evidence at the completion of the year.

Tuberculosis

The outstanding public health achievement of the year is still another reduction in the tuberculosis deathrate—to a new low point for this part of the year. The cumulative tuberculosis mortality rate is 64.6 per 100,000, an improvement of 5.3 per cent. over the previous low point—recorded only last year. We may expect, on the basis of previous experience, that the tuberculosis figure for the completed year will be not far from 5 per cent. below that recorded at the end of the half year. It will not be surprising, therefore, if 1934 registers a tuberculosis mortality rate of, or below, 60 per 100,000—a most encouraging condition among an industrial wage-earning population.

Diphtheria

While the diphtheria deathrate has become a negligible item in mortality statistics, it is nevertheless gratifying to observe that the mortality is still declining and is rapidly approaching the point where it will be unity, or less.

Puerperal Diseases

The record for the diseases of pregnancy and childbirth is another favorable item in the health report of the first half of this year. The deathrate from these diseases has been dropping practically continuously among Metropolitan Industrial policyholders for a long period. Still another new minimum is now in prospect. It is true that the drop in the deathrate from these causes has been due, in part, to a steadily declining birthrate, as the result of which fewer women have been exposed to the hazards of the puerperal state. But it is also true that the deathrate from these diseases is dropping faster than is the birthrate. We believe that among women in the Metropolitan population some real improvement is being made.

Where the Deathrate Has Increased

There have been very considerable rises in the crude mortality rates from a number of causes of death. The rate for measles is double last year's figure and that for whooping cough, almost double. No particular significance attaches to these two increases, however, as the rates are

still extremely low, and we expect sharp variations in their deathrates on account of the well-known cycles in their mortality. The rises observed in the mortality from cancer, diabetes, the principal degenerative diseases (heart disease, in particular), pneumonia, accidents and automobile fatalities, are more important. In the case of cancer and the degenerative diseases, the higher deathrate is due, in part at least, to the rising average age of the Industrial policyholders. Inasmuch as a large majority of the deaths from these diseases affect persons in the higher age groups, an increase in the average age tends to raise the crude deathrate. At the end of 1933 we found, on the basis of corrected figures, that the mortality rates for cancer and diabetes were still higher than ever before, but that there had been no such sharp rise as the crude rates indicated. The deathrate for heart disease, when standardized for age, was actually lower than in 1930. Similar developments may be in evidence when it becomes possible to show standardized deathrates for the entire year 1934.

Sharp Rise for Pneumonia

The outstandingly unfavorable development in the health picture of 1934 is an abrupt rise (15 per cent.) in the pneumonia deathrate. This rise is in sharp contrast with the continuously declining mortality rate observed since 1929. The 1934 increase has occurred during the very months when the influenza deathrate dropped nearly 50 per cent. from last year's figure. This is a most unusual phenomenon, as high rates from these diseases ordinarily go together. Obviously, relatively little of the fatal pneumonia this year was of influenzal origin. A goodly share of the deaths were probably due to the stress of the unusually cold weather of last winter. This, nevertheless, is not the sole explanation, as the 1934 April and May pneumonia mortality rates were sharply higher than those for the like months of 1933. The changing age distribution among our Industrial policyholders also tended to raise the crude deathrate of pneumonia. Whatever the cause, the increase is unmistakable; and such fragmentary mortality data as are available for the general population, for 1934, to date, show that there also this disease has been responsible for many more deaths this year than in the first half of 1933.

Alcoholism

Although alcoholism is a minor cause of death, both among the insured and the general population, some interest attaches to its deathrate during the first half-year since the end of the prohibition era. A very slight rise (from 2.2 deaths per 100,000 insured in 1933 to 2.3 in 1934) is shown for Metropolitan Industrial policyholders. This rise, however, has not affected the white policyholders whose deathrate dropped from 2.2 per 100,000 in 1933, to 2.0 in 1934.

Deathrates per 100,000 Persons Exposed. First Six Months of 1932, 1933, 1934 Compared. By Color for Principal Causes of Death. All Ages. Metropolitan Life Insurance Company, Weekly Premium-Paying Industrial Business.

Causes of Death	Deathrate per 100,000 Persons Exposed					
	White			Colored		
	Jan.-June 1934*	Jan.-June 1933	Jan.-June 1932	Jan.-June 1934*	Jan.-June 1933	Jan.-June 1932
Total—All Causes	863.0	845.4	833.1	1632.9	1531.6	1549.4
Typhoid fever	.8	.7	1.1	2.3	1.8	2.3
Measles	4.9	2.6	3.0	3.7	.9	1.4
Scarlet fever	3.7	3.9	4.2	1.2	1.2	1.6
Whooping cough	4.1	2.3	3.6	5.0	1.7	4.5
Diphtheria	2.2	2.5	4.7	1.0	1.0	2.3
Influenza	13.9	29.3	22.3	38.6	61.0	54.5
Meningococcus meningitis	1.2	1.5	1.4	1.0	2.4	2.0
Tuberculosis (All forms)	51.6	54.1	58.4	171.2	182.7	206.5
Tuberculosis of respiratory system	45.6	48.3	51.3	149.8	162.4	183.4
Tuberculosis of the meninges, etc.	2.6	2.3	2.9	5.3	4.7	5.2
Other forms of tuberculosis	3.3	3.5	4.1	16.0	15.6	17.9
Cancer (All forms)	97.0	92.4	89.0	108.8	96.7	101.6
Diabetes mellitus	26.7	25.6	23.6	31.4	29.7	28.1
Alcoholism	2.0	2.2	2.7	4.9	2.4	3.8
Cerebral hemorrhage; apoplexy	61.9	60.9	57.9	138.3	128.9	134.9
Diseases of heart†	169.4	162.5	153.3	311.1	290.1	262.0
Total respiratory diseases	92.3	83.8	86.2	191.5	148.3	165.9
Bronchitis	3.4	2.9	2.8	3.4	4.4	4.7
Bronchopneumonia	32.3	30.1	30.5	53.4	40.2	41.5
Pneumonia (lobar and undefined)	49.4	43.3	45.9	123.1	92.6	107.8
Other diseases of respiratory system	7.3	7.6	7.1	11.6	11.1	12.0
Diarrhea and enteritis	7.5	7.8	8.3	9.9	7.5	7.6
Under 2 years	5.6	5.8	6.4	4.4	3.0	3.1
2 years and over	1.9	2.0	2.0	5.5	4.5	4.6
Acute nephritis	2.6	2.4	3.1	9.9	10.8	10.3
Chronic nephritis (Bright's disease)	62.7	62.6	63.2	150.0	143.8	142.8
Puerperal state—Total	9.2	9.6	10.2	15.8	15.6	16.7
Total external causes	66.0	63.4	65.4	106.9	101.8	96.0
Suicides	10.3	10.5	11.4	7.6	9.1	8.2
Homicides	2.8	3.1	3.2	29.7	29.7	31.4
Accidents—Total	52.9	49.8	50.8	69.6	63.0	56.5
Automobile accidents	19.1	17.2	17.7	21.1	18.8	19.1
All other diseases and conditions	183.2	175.1	171.6	330.5	303.4	304.4

*The rates for 1934 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.

†Excludes pericarditis, acute endocarditis, acute myocarditis and angina pectoris.

Deaths from Violence

During the first half of 1934 there were fewer suicides and homicides than were recorded for the similar part of 1933, but there were more deaths from accidents, and particularly from automobile injuries. The deathrate for the last-named rose 11.5 per cent. We have explained in earlier numbers of the STATISTICAL BULLETIN that we believe much of the increase observed this year in fatal accidents is due to the fact that more persons are employed, and thus subject to the hazards of industry; also that the rise in automobile fatalities has resulted from the increase in the amount of motor vehicle traffic—both pleasure and commercial, on our highways.

Electrical Fatalities Are Most Numerous in Summer

IN AN article in the previous number of this BULLETIN it was shown that more fatal accidents occur in the summer months than at other seasons of the year. It was stated, further, that apart from deaths from electric shocks (lightning excepted), the reasons for the summertime predominance of certain types of accident were apparent. Since the above article was written, we have studied the facts relating to deaths from accidental electric shocks among Metropolitan Industrial policyholders, over a period of 22 years; and we now find that the reasons why over one-half of these occur in the warm months (June to September) are clear-cut.

In the first place, employment of electric linemen, electricians and other electrical workers is at the maximum in the summer months, when for the most part new lines are strung and existing services extended. Secondly, and possibly a factor of considerable importance, is the added susceptibility to fatal shock in the warm months because the body is wet with perspiration.

While electrical shock is, numerically, one of the less important means of fatal accidental injury, it is nevertheless responsible for more than 700 deaths each year in the United States. About 90 per cent. of these deaths occur among males fifteen years of age and older, and the vast majority of them result from injuries sustained in the course of employment. In the experience of the Industrial policyholders of the Metropolitan Life Insurance Company, occupational deaths account for 80 per cent. of all the deaths by this means of injury. Electric linemen, electricians, and other electrical workers are, of all persons, most liable to exposure to electric shocks, and inevitably, are the heaviest contributors to the annual toll of deaths from this cause. The actual number of such deaths throughout the United States, among electrical workers, is not known, but a review of the death claim records among insured wage-earners indicates that upward of 60

per cent. of all occupational electrical fatalities occur among them.

Standardized deathrates for the 22-year period 1911 to 1932, for Industrial policyholders of the Metropolitan Life Insurance Company, ranged from a minimum of .5 deaths per 100,000 in 1932, to a maximum of 1.2 in 1913, 1916 and 1918. No definite trend in the deathrate is discernible. The rate for the year 1930 was, in fact, the same as that for 1911, .9 per 100,000. Rates of only .5 and .6 per 100,000 for the years 1932 and 1931, respectively, reflect the extreme effect of unemployment during the recent depression years. Similarly, the crude deathrates for the general population of the United States Registration Area, over the same period, show no definite upward or downward tendency. It should be borne in mind, in interpreting these figures, that in the years covered by this investigation the production of electricity has increased more than five fold, and the number of electrical workers has more than doubled, while the population of the United States has increased by only one-third. The fairly constant deathrate, during a period of increasing use of electricity, suggests that the efforts of the electrical companies to safeguard their employees and the general public have met with a large measure of success.

A study of the deaths of Industrial policyholders covering the years 1926 to 1930, has revealed that among adult males, aged 15 to 64 years, 88.5 per cent. of the deaths from electricity occurred in industry, and only 3.0 per cent. at home, whereas among adult females, practically all occurred in the home. Among children between the ages of 5 and 14 years, 89.5 per cent. of the deaths occurred in public places.

Deaths in the home, of which there were 35 recorded among our Industrial policyholders in this five-year period, focus attention on the hazard of low voltage circuits, which, it is all too commonly believed, will not kill. Some of these home deaths, it is true, were caused by electrical burns, and some of them involved high voltages; but it is unquestionably true, also, that a goodly number of them resulted from contact with the ordinary house current of 110 volts. The general reliance on the relative harmlessness of low voltages has been a factor in causing deaths in industry as well as in the home. Low voltages can kill, and this fact should be brought home to everyone. Handling electrical equipment while the hands or other parts of the body are wet is especially dangerous. Many cases have been reported of persons who received a fatal shock when handling electrical apparatus while in the bathtub, or before drying after bathing.

The large percentage of electrical fatalities in public places among children of school age reflects the venturesomeness of boys of that age. Playing about the right-of-way of public utilities, and climbing telephone and power poles cause many deaths annually.

Health Record for June, 1934

Health conditions among the Industrial policyholders during June were extremely good. Their deathrate, 8.4 per 1,000, closely approached the lowest figure ever recorded for that month, namely, 8.3 in June, 1929. Last year's June deathrate was 8.8 per 1,000.

Comparison with the record for June, 1933 shows lower deathrates for the current year from the majority of the principal causes of death, although pneumonia is an outstanding exception.

The deathrate in the general population of the large cities of the United States, for the month of June, was 10.7 per 1,000 estimated population, as compared with 11.7 in May and with 10.6 in June of last year. There were more cases of poliomyelitis and typhoid fever in June than in May, but there was less sickness from diphtheria, influenza, measles, scarlet fever and smallpox. Comparison with June of last year shows more cases of influenza, measles, scarlet fever and poliomyelitis, together with less illness from diphtheria, smallpox and typhoid fever.

There were 1,321 cases of poliomyelitis reported during June by 45 states, as compared with only 238 cases in May. This increase was due, almost entirely, to the wide prevalence of poliomyelitis in California, where the cases rose from 161 in May to 1,183 in June. The California outbreak, however, appears to be subsiding. Its peak was reached in the week ending June 23rd. Up to the week ending July 7th there have been no indications that the disease is spreading to adjoining states. There appears to be no unusual prevalence of poliomyelitis elsewhere in the country.

The following items are of special public health interest.

GOVERNOR LEHMAN of New York recently signed the bill authorizing the establishment of non-profit group payment plans for hospital care. The gift of DR. FREDERICK L. HOFFMAN'S cancer library, made jointly by the Prudential Insurance Company and Dr. HOFFMAN, to the Cancer Research Laboratories of the UNIVERSITY OF PENNSYLVANIA GRADUATE SCHOOL OF MEDICINE is a notable event in the medical history of Philadelphia. Eventually the present Cancer Research Library of the Cancer Research Laboratories will be combined with the HOFFMAN collection, making a reference library for cancer which will be unique as well as very valuable. The GYNECEAN HOSPITAL INSTITUTE of Gynecologic Research of the University of Pennsylvania is conducting an intensive study of families into which congenitally malformed individuals have been born. Special interest centers about the families in which malformations have appeared in two or more children.

The following table shows the mortality among Industrial policyholders for June, 1934; May, 1934, and June, 1933, together with the cumulative rates for the first six months of each year.

METROPOLITAN LIFE INSURANCE COMPANY

Deathrates per 100,000 for Principal Causes. Weekly Premium-Paying Business in Industrial Department. All Ages (Annual Basis).*

MONTHS OF JUNE, 1934; MAY, 1934, AND JUNE, 1933

CAUSES OF DEATH	ANNUAL RATE PER 100,000 LIVES EXPOSED*				
	June 1934	May 1934	June 1933	Cumulative January-June	
				1934	1933
TOTAL—ALL CAUSES	839.1	908.3	882.7	947.0	920.3
Typhoid fever	.8	.7	.9	1.0	.8
Measles	3.6	6.3	2.2	4.8	2.4
Scarlet fever	2.7	2.1	2.8	3.4	3.6
Whooping cough	4.6	4.4	2.0	4.2	2.3
Diphtheria	1.7	1.3	2.2	2.1	2.3
Influenza	5.6	11.5	7.0	16.6	32.8
Tuberculosis (All forms)	63.0	66.3	70.8	64.6	68.2
Tuberculosis of respiratory system	55.3	58.7	62.7	57.0	60.8
Cancer (All forms)	96.3	96.7	100.0	98.3	92.9
Diabetes mellitus	23.1	23.9	23.9	27.2	26.0
Cerebral hemorrhage; apoplexy	61.2	67.9	63.6	70.2	68.3
Diseases of heart†	157.5	172.2	164.5	184.9	176.4
Pneumonia (All forms)	53.3	80.5	46.6	92.0	79.8
Other respiratory diseases	9.0	11.3	9.4	11.1	11.0
Diarrhea and enteritis	10.1	9.0	11.2	7.8	7.8
Chronic nephritis (Bright's disease)	65.4	64.4	73.7	72.2	71.4
Puerperal state—Total	8.9	9.4	8.8	10.0	10.3
Suicides	9.5	11.4	10.0	10.0	10.3
Homicides	5.2	6.1	7.0	5.8	6.0
Accidents—Total	59.9	51.0	65.1	54.7	51.2
Automobile accidents	20.0	17.3	20.7	19.4	17.4
All other diseases and conditions	197.7	211.9	211.0	206.2	196.2

*The rates for 1934 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.

†Excludes pericarditis, acute endocarditis, acute myocarditis and angina pectoris.

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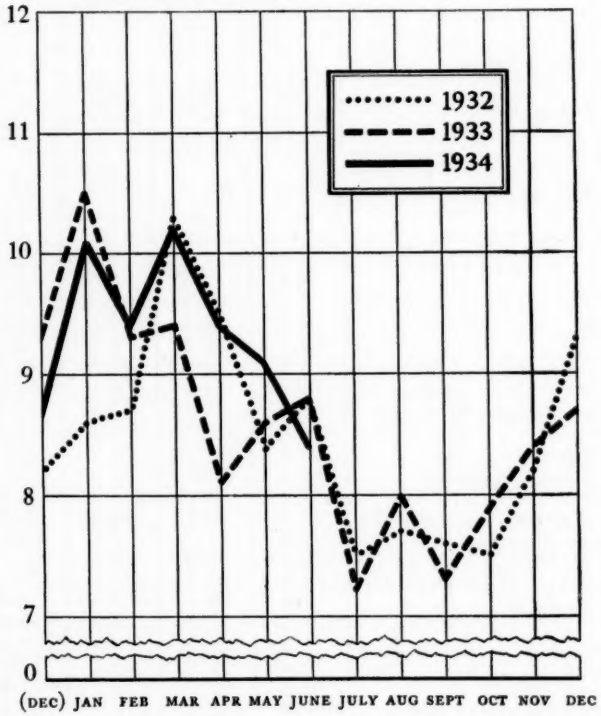
DEATHRATES FROM ALL CAUSES

in the Metropolitan Life Insurance Company
Industrial Department

DEATHRATE PER 1,000 — ANNUAL BASIS



1932	8.6	8.7	10.3	9.5	8.4	8.8	7.5	7.7	7.6	7.5	8.2	9.3
1933	10.5	9.3	9.4	8.1	8.6	8.8	7.2	8.0	7.3	7.9	8.4	8.7
1934*	10.1	9.4	10.2	9.4	9.1	8.4						

**Rates for 1934 are provisional.*

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